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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/728,197	12/03/2003	Steven C. Quarre	044182 307083	7284

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EXAMINER	
EARLY, MICHAEL JACOBY	

ART UNIT	PAPER NUMBER
3744	

DATE MAILED: 10/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/728,197	QUARRE, STEVEN C.	
	Examiner	Art Unit	
	Michael J. Early	3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 August 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7-37 and 39-41* is/are rejected.

7)☒ Claim(s) *6 and 38* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments, see Remarks (pages 1-3), filed 8/23/06, with respect to the alleged Improper Final Rejection have been fully considered and are persuasive. The rejection of claims 1-5, 7-37 and 39-41 has been withdrawn.

Applicant has stated and justified their argument regarding the prior acknowledgment of the cavity by the previous Examiner as well as the intended scope of the claims (see Remarks, pages 1-2).

Below is a Non-Final Office Action regarding the patentably of the claimed limitations.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-5 and 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itakura et al. (U.S. 2003/0019216 A1) in view of Swaitosz (U.S. 4,253,515).

Itakura et al. disclose:

- coupling said charge-coupled device (80 – laser diode) to a cold side (side/surface located between thermoelectric chip [25] and second board [24]) of a thermoelectric cooling device (25 – thermoelectric chip) (as seen in Figure 6B);
- coupling a hot side (side/surface between located thermoelectric chip [25] and first board [22]) of said thermoelectric cooling device to a transfer plate (22 – first board) (as seen in Figure 6B);
- mounting said transfer plate to a thermal barrier (50 – flat mounting surface), said thermal barrier defining a cavity that is adapted to house the charge-coupled device (as seen in Figure 6A);
- coupling said transfer plate to a heat sink (81 – heat sink, Figure 6A – first board [22] and heat sink [81] are thermally coupled to one another);
- interposing a spacer (6 – heat transfer block) between said charge-coupled device and said cold side of said thermoelectric cooling device (as seen in Figure 6A);
- said interposing comprises selectively dimensioning said spacer lo maximize a surface area of contact between said charge-coupled device and said cold side of said thermoelectric cooling device (As seen in Figure 6A, the heat transfer block [6] is wider than both the cold side of the thermoelectric chip [25] and laser diode [80], thus maximizing the surface area between the two components.);
- said interposing comprises selectively dimensioning said spacer to position said hot side of said thermoelectric cooling device in a predetermined location relative to said charge-coupled device (as seen in Figures 6A, 6B);
- selectively applying a conformal coating (71 – first solder layer) to at least one of said transfer plate, said thermal barrier, and an interface between said transfer plate and said thermal barrier (as seen in Figure 6B);
- cooling said hot side of said thermoelectric cooling device (this is performed as heat is transferred from the hot to the cold side of the thermoelectric module; paragraph 0019);

- said cooling comprises transferring heat generated by said thermoelectric cooling device from said charge-coupled device (see paragraph 0019 and furthermore, the general purpose of a thermoelectric cooling device is to remove heat generated by an electronic device).

Itakura et al. do not explicitly disclose:

- a charge-coupled device;
- details related to an epoxy laminate.

Itakura et al. do however, teach of a thermoelectric module that is used to cool a laser diode. At the time of the invention, one of ordinary skill in the art would have known that the means for cooling a laser diode are applicable for cooling a charge-coupled device (CCD).

Regarding claim 1, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the existing apparatus of Itakura et al. by using a laser diode in place of the charge-coupled device, because the prior art of Itakura et al. meet the structural limitations associated with the present application and furthermore, the use of a thermoelectric module to cool an electrical component (i.e. charge-coupled device, laser diode, etc.) is well known in the art.

Swiatosz teaches a mounting process using epoxy laminate material to be old in the art (see col. 4, lines 15-19).

Regarding claim 1, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the existing apparatus of Itakura et al. by incorporating epoxy laminate for mounting and isolation purposes (see Specification, page 4, lines 17-22), as taught by Swaitosz, to provide optimum isolation and insulation, and minimum separation between surfaces connected.

Claims 11-16, 18, 20-29, 32-35, 37 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itakura et al.

Regarding claims 11-16, 18 and 20; Itakura et al. disclose:

- a charge-coupled device (80 – laser diode) mounted in a housing (5 – metallic package), said housing including a thermal barrier (50 – flat mounting surface) and a cavity (as seen in Figure 6A) for mounting said charge-coupled device;
- a thermoelectric cooling device (25 – thermoelectric chip) having a cold side (side/surface located between thermoelectric chip [25] and second board [24]) and a hot side (side/surface between located thermoelectric chip [25] and first board [22]); said cold side coupled (thermally coupled) to said charge-coupled device (as seen in Figure 6A);
- a heat sink (81 – heat sink);
- a transfer plate (22 – first board) coupling said hot side of said thermoelectric cooling device to said heat sink in a heat transfer relationship (as seen in Figure 6A); said transfer plate mounted to said thermal barrier (as seen in Figure 6B);
- a spacer (6 – heat transfer block) interposed between said charge-coupled device and said cold side of said thermoelectric cooling device (as seen in Figure 6A);
- said spacer is selectively dimensioned to maximize a surface area of contact between said charge-coupled device and said cold side of said thermoelectric cooling device (As previously disclosed, the heat transfer block [6] is able to maximize the surface area between the laser diode [80] and cold side of the thermoelectric chip [25]; Figure 6A);
- said spacer is selectively dimensioned to position said hot side of said thermoelectric cooling device in a predetermined position relative to said charge-coupled device (as seen in Figures 6A, 6B);

- a conformal coating (71 – first solder layer) applied to at least one of said transfer plate, said thermal barrier, and an interface between said transfer plate and said thermal barrier (as seen in Figure 6B);
- said conformal coating provides an environmentally tight moisture barrier (intended use);
- said transfer plate is constructed of a heat-conducting metal (see paragraph 0033);
- said spacer is constructed of a heat-conducting metal (see paragraph 0040).

With regards to those limitations that are functional recitations, a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the *structural* limitations of the claimed.

Itakura et al. do not explicitly teach:

- a charge-coupled device.

Itakura et al. do however, teach of a thermoelectric module that is used to cool a laser diode. At the time of the invention, one of ordinary skill in the art would have known that the means for cooling a laser diode are applicable for cooling a charge-coupled device (CCD).

Regarding claim 11, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the existing apparatus of Itakura et al. by using a laser diode in place of the charge-coupled device, because the prior art of Itakura et al. meet the structural limitations associated with the present application and furthermore, the use of a thermoelectric module to cool an electrical component (i.e. charge-coupled device, laser diode, etc.) is well known in the art.

Regarding claims 21-29, Itakura et al. disclose a method comprising:

- providing a cavity (as seen in Figure 6A) in a housing (5 – metallic package), said cavity adapted to house said charge-coupled device (as seen in Figure 6A);
- coupling said charge-coupled device (80 – laser diode) to a cold side (side/surface located between thermoelectric chip [25] and second board [24]) of a thermoelectric cooling device (25 – thermoelectric chip) (as seen in Figure 6B);
- coupling a hot side (side/surface between located thermoelectric chip [25] and first board [22]) of said thermoelectric cooling device to a transfer plate (22 – first board) (as seen in Figure 6B);
- sealing said cavity (as seen in Figure 6A);
- said sealing operable to provide a substantially environmentally-tight barrier for said charged-coupled device (intended use);
- interposing a spacer (6 – heat transfer block) between said charge-coupled device and said cold side of said thermoelectric cooling device (as seen in Figure 6A);
- said interposing spacer between said charge-coupled device and said cold side of said thermoelectric cooling device comprises selectively dimensioning said spacer to maximize a surface area of contact between said charge-coupled device and said cold side of said thermoelectric cooling device (As previously disclosed, the heat transfer block [6] is able to maximize the surface area between the laser diode [80] and cold side of the thermoelectric chip [25]; Figure 6A);
- said interposing spacer between said charge-coupled device and said cold side of said thermoelectric cooling device comprises selectively dimensioning said spacer to position said hot side of said thermoelectric cooling device in a predetermined location relative to said charge-coupled device (as seen in Figures 6A, 6B)

- cooling said hot side of said thermoelectric cooling device (this is performed as heat is transferred from the hot to the cold side of the thermoelectric module; paragraph 0019);
- said cooling comprises transferring heat generated by said thermoelectric cooling device from said charge-coupled device (see paragraph 0019 and furthermore, the general purpose of a thermoelectric cooling device is to remove heat generated by an electronic device);
- said sealing comprises applying a conformal coating (71 – first solder layer);
- said sealing is operable to prevent moisture from penetrating said cavity (it is essential for this type of apparatus to operate in dry conditions because of the performance and reliability problems associated with operating in moist environments);
- interposing a thermal barrier (22 – first board) between said housing and said transfer plate (as seen in Figure 6B).

With regards to those limitations that are functional recitations, a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the *structural* limitations of the claimed.

Itakura et al. do not explicitly teach:

- a charge-coupled device.

Itakura et al. do however, teach of a thermoelectric module that is used to cool a laser diode. At the time of the invention, one of ordinary skill in the art would have known that the means for cooling a laser diode are applicable for cooling a charge-coupled device (CCD).

Regarding claim 21, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the existing apparatus of Itakura et al. by using a laser diode in place of the charge-coupled device, because the prior art of Itakura et al. meet the structural limitations associated with the present application and furthermore, the use of a thermoelectric module to cool an electrical component (i.e. charge-coupled device, laser diode, etc.) is well known in the art.

Regarding claims 32-35, 37 and 39; Itakura et al. disclose:

- a housing (5 – metallic package) having a cavity (as seen in Figure 6A) defined therein, said cavity operative to mount a charge-coupled device (80 – laser diode) (as seen in Figure 6A);
- a thermoelectric cooling device (25 – thermoelectric chip) having a cold side (side/surface located between thermoelectric chip [25] and second board [24]) and a hot side (side/surface between located thermoelectric chip [25] and first board [22]), said cold side coupled (thermally coupled) to said charge-coupled device (as seen in Figure 6A);
- a heat sink (81 – heat sink);
- a transfer plate (22 – first board) coupling (thermally coupling) said hot side of said thermoelectric cooling device to said heat sink in a heat transfer relationship (as seen in Figures 6A, 6B);
- a conformal coating (71 – first solder layer);
- said conformal coating operable to provide a substantially environmentally tight barrier for said charge-coupled device (it is essential for this type of apparatus to operate in dry conditions because of the performance and reliability problems associated with operating in moist environments);
- a spacer (6 – heat transfer block) interposed between said charge-coupled device and said cold side of said thermoelectric cooling device (as seen in Figure 6A);

- said spacer selectively dimensioned to maximize a surface area of contact between said charge-coupled device and said cold side of said thermoelectric cooling device (As previously disclosed, the heat transfer block [6] is able to maximize the surface area between the laser diode [80] and cold side of the thermoelectric chip [25]; Figure 6A);
- said spacer is selectively dimensioned to position said hot side of said thermoelectric cooling device in a predetermined location relative to said charge-coupled device (as seen in Figures 6A, 6B);
- said transfer plate is constructed of a heat-conducting metal (see paragraph 0033);
- interposing a thermal barrier (22 – first board) between said housing and said transfer plate (as seen in Figure 6B).

With regards to those limitations that are functional recitations, a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the *structural* limitations of the claimed.

Itakura et al. do not explicitly teach:

- a charge-coupled device.

Itakura et al. do however, teach of a thermoelectric module that is used to cool a laser diode. At the time of the invention, one of ordinary skill in the art would have known that the means for cooling a laser diode are applicable for cooling a charge-coupled device (CCD).

Regarding claim 32, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the existing apparatus of Itakura et al. by using a

laser diode in place of the charge-coupled device, because the use of a thermoelectric module to cool an electrical component is well known in the art.

Claims 17 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itakura et al. in view of Kiga (U.S. 5,332,031).

Itakura et al. do not disclose:

- details related to a Peltier cooling device.

Kiga teaches of a cooling system for cooling heat-producing electronic devices (see Abstract). Kiga further discloses that it is old in the art to use a Peltier cooling device to cool an electric device (see col. 1, lines 13-32).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the existing apparatus of Itakura et al. by incorporating a Peltier cooling device, as taught by Kiga, because of its of precise temperature control capability and longevity.

Claims 19, 30, 31, 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itakura et al. in view of Swaitosz.

Itakura et al. do not disclose:

- details related to an epoxy laminate.

Swiatosz teaches a mounting process using epoxy laminate material to be old in the art (see col. 4, lines 15-19).

Regarding claims 19, 30 and 40; it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the existing apparatus of Itakura et al. by incorporating epoxy laminate for mounting and isolation purposes (see

Specification, page 4, lines 17-22), as taught by Swaitosz, to provide optimum isolation and insulation, and minimum separation between surfaces connected.

Allowable Subject Matter

Claims 6 and 38 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Early whose telephone number is (571) 272-3681. The examiner can normally be reached on Monday - Friday, 7am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler can be reached on (571) 272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MJE
9/20/06

Michael J. Early
Patent Examiner
Art Unit 3744

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